

## PARTITION MOUNT WITH EXTENDED-LENGTH HEAD

### RELATED APPLICATIONS

This application claims the benefit of the filing date of United States Provisional Patent Application Serial No. 60/403,681, filed August 15, 2002.

### BACKGROUND OF THE INVENTION

Partition systems are often employed to isolate portions of a building or room, by serving as a barrier to dust, noise, light, odors, and the like. In construction zones, partitions are useful for protecting a clean area from a work area, for example, protecting an area where furniture and rugs are temporarily stored from an area where wood floors are being refinished.

Workers at construction sites often use rudimentary techniques for installing partitions. Some simply nail, screw, or staple the curtain or partition material to the floor, ceiling, and abutting walls, resulting in damage to their surfaces. Others tape, or otherwise adhere, a curtain or plastic sheet to the walls and ceilings. The tape usually fails to stick, but if it does stick, as the tape is removed, paint can pull off with the tape, or adhesive is left behind.

United States Patent No. 5,924,469, the content of which is incorporated herein by reference, discloses a partition mount system that addresses these limitations. This system offers the advantage of accommodating standard extension poles, for example, painters poles, with standard threads, and is compatible with a variety of commercially-available curtain or drape materials, for example plastic, cloth, and the like. The disclosed system is a "clean" system designed to be installed and removed without damaging or otherwise marking the ceiling, floor or walls in the construction zone. Assembly is easy and fast and can be accomplished by a single individual. In certain applications however, a sag, or gap, may be present in the curtain between installed mounting jacks along a ceiling, or between the ceiling and floor along a wall or door frame, compromising the effectiveness of the installation.

## SUMMARY OF THE INVENTION

The present invention is directed to a system that mitigates or eliminates sag, or gaps, between an installed curtain and an abutting surface such as a wall or ceiling. The system accomplishes this in a manner that avoids permanent damage to the wall or ceiling surface. A head is provided having an elongated body and a compressible curtain interface. An adjustable pole is configured to urge the head against the curtain and abutting surface. In one example, the pole is spring-loaded. In this manner, the curtain is made to conform to the abutting surface, and gaps are thereby mitigated or eliminated between mounting jacks, or between a mounting jack and another mounting point.

In one aspect, the present invention is directed to a mounting system. The system comprises an elongated body having a longitudinal axis. A curtain interface, for example a pad, is coupled to an upper surface of the body. A coupler includes an interface for receiving a mounting member, the position of the coupler being adjustable relative to the longitudinal axis of the body.

The pad may comprise any of a number of materials, for example, foam, polyurethane foam, extruded vinyl, rubber strips, and the like. The pad may be freely compressible, or non-compressible. A non-skid pad material is preferred to avoid slippage.

The body may take the form of an extruded rail, for example including a U-shaped slot, wherein the pad is mounted in the slot. Any of a number of various forms of rail and pad are applicable.

The coupler is preferably removably mountable to the body. The coupler may include, for example, quick-release arms that engage a feature on the body for removably mounting the coupler to the body. The position of the coupler relative to the body can be adjusted variably, or can be determined according to indexed positions on the body.

The mounting member preferably comprises a mounting pole, in which case, the coupler includes a socket for receiving a ball joint of a mounting pole. The body is for example rotatable relative to the mounted pole. The coupler further includes an optional retainer for preventing lateral rotation of the body relative to the mounting pole. The ball joint of the mounting pole further includes an optional flange having a flat surface for interfacing with the retainers for preventing horizontal pivot of the body about the mounting pole. The pole is preferably adjustable in length, and may include an optional compression mechanism to allow for compression along a longitudinal axis thereof.

The length of the body is preferably substantially greater than the width of the body, for example the length of the body is at least 1 ft in length.

In another aspect, the present invention is directed to a mounting system. The system includes a pole and an elongated body having a longitudinal axis. A pad is coupled to an upper surface of the body. A coupler rotatably couples the pole to the body.

In a preferred embodiment, the coupler rotatably couples the pole to the body such that the longitudinal axis of pole is parallel to, or lies in, a rotational plane of the longitudinal axis of the body. In another embodiment, the coupler removably couples the pole to the body.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other objects, features and advantages of the invention will be apparent from the more particular description of preferred embodiments of the invention, as illustrated in the accompanying drawings in which like reference characters refer to the same parts throughout the different views. The drawings are not necessarily to scale, emphasis instead being placed upon illustrating the principles of the invention.

FIG. 1 is a perspective view of an installed partition mount having an extended head, in accordance with the present invention.

FIG. 2 is a close-up perspective view of the partition mount of FIG. 1 in accordance with the present invention.

FIG. 3 is a close-up perspective view of a head coupler in accordance with the present invention.

FIGs. 4A and 4B are side views of the head coupler being coupled to a head, in accordance with the present invention. FIG. 4C is a top view of the ball and neck assembly, including a flange having flat edges for limiting lateral rotation of the head about the ball, in accordance with the present invention.

FIG. 5 is a perspective view of an installed curtain, illustrating sag in the curtain between partition mounts.

FIG. 6 is a perspective view of an installed curtain, including an extended-head mount mitigating sag in the curtain along the ceiling in accordance with the present invention.

FIG. 7 is a perspective view of an installed curtain, including an extended-head mount mitigating sag in the curtain along a wall in accordance with the present invention.

FIG. 8 is a perspective view of an installed partition mount having an extended head that utilizes a plurality of supporting poles, in accordance with the present invention.

FIGs. 9A and 9B are side views of alternative embodiments of the head coupler and head interface, in accordance with the present invention.

FIGs. 10A, 10B, 10C, and 10D are side views of alternative embodiments of the head pad, in accordance with the present invention.

FIG. 11 is a perspective view of an alternative embodiment of the partition mount, in accordance with the present invention.

#### DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

FIG. 1 is a perspective view of an installed partition mount 10 having an extended head, in accordance with the present invention. A spring-loaded jack curtain mount, referred to herein as a "jack" 12, attaches to an adjustable-length pole 14 at a first interface 24. In one example, the first interface 24 is threaded so as to accommodate a standard painter's pole 14. A second interface in the form of a coupler 20 is opposite the first interface 24, and is positioned on a neck 21 that travels with respect to the jack body, biased by an enclosed compression spring (not shown). Other forms of jacks, poles, and compression mechanisms, for example those disclosed in United States Patent No. 5,924,469 incorporated herein by reference above, are equally applicable to the present invention.

An elongated head 16 attaches to the jack 12 at the coupler 20. A pivot in the coupler 20 permits rotational movement of the head 16, relative to the pole 14 and jack 12, for example in a single degree of freedom of rotation, that is, for example, parallel to the longitudinal axis 17 of the head 16. The coupler 20 allows for the partition mount 10 to be installed in a variety of configurations, for example in a configuration where the ceiling and floor are not parallel. In various embodiments, the coupler 20 may comprise a hinge, or preferably, a snap-fit ball-and-socket joint that is, for example, limited in rotational degrees of freedom to allow for pivoting between the elongated head 16 with respect to the pole 14 and jack 12, and to limit lateral rotation. The coupler 20 may be located at any position along the longitudinal axis 17 of the head 16, and may be in a fixed longitudinal position, or alternatively, in a variable longitudinal position that can be set by a user during installation. Alternatively, multiple poles 14 and jacks

12 may be mounted at various positions along a common head 16, for example at the opposite ends of the head 16, in order to avoid placing the poles 14 supporting the head 16 in a central position of a doorway.

With reference to FIG. 2, which is a close-up perspective view of the partition mount of FIG. 1, in one embodiment, the elongated head 16 comprises a rail body 40 generally having a U-shaped cross-section, the rail including a channel 19 that is shaped to receive an edge of a compressible pad, for example in the form of a foam block 18. The rail may be formed, for example, of extruded aluminum, or may otherwise be molded or die cast, for example of plastic, PVC, graphite or other resilient material. The foam block 18 is rectangular in shape and extends over the length of the head 16. The foam block 18 may be compressed and seated into the channel 19, or may otherwise be glued or bonded to the rail 40. A portion of the body of the foam block 18 extends from the outer edge 42 of the rail 40 as shown, such that the foam compresses at installation to provide for lateral rigidity and conformance between the head, curtain and installation surface. The foam block 42 is preferably formed of a non-skid material to prevent slippage.

In alternative embodiments, rather than having a U-shaped cross-section, the head 16 may comprise a rail 40 having a flat upper surface, and the compressible material (for example, the foam block 18) may be bonded directly to the upper surface of the flat rail 40. Alternatively, the head 16 may be formed of a material that is substantially laterally rigid, so as to avoid flex, and compressible in the direction of the ceiling, or entirely rigid, depending on anticipated use. In one embodiment, the head 16 is of a length that is substantially longer than a width thereof, for example, the length is on the order of 2-4 feet, and the width is on the order of 1-2 inches. Other geometries are equally applicable, depending on system requirements.

The spring-loaded jack 12 is coupled to the longitudinally extended head 16 at coupler 20. The coupler 20 has a "U"-shaped cross section and includes mounting arms 68 with

retention tabs 54 at its base, a socket 62 at a central location of the body 50, neck retainers 52 along side portions of the body 50 and handles 64 at upper portions of the body 50. The socket 62 receives a ball 60 provided at the end of neck 21 of the jack 12. The ball 60 and socket 62 are preferably in a snap-fit relationship and together form a universal joint for allowing rotation of the head 16 relative to the jack 12 and pole. The socket is preferably of a geometry so as to receive a ball of the type described in United States Patent No. 5,924,469, such that the head 16 of the present invention is compatible with the mounting jack described therein. The neck retainers 52 limit the rotation on the universal joint to one degree of freedom, for example along a plane defined between the longitudinal axis 17 of the head 16 and the pole and jack 12. The coupler 20 further includes a pin 66 along its base, which is adapted to slide within a central groove 58 of the rail 40 to provide for additional system rigidity and to serve as a mounting alignment locator.

The "U"-shaped coupler 20 includes opposed handles 64. When inward pressure is exerted on the handles 64, this causes the body of the coupler 20 to elastically deform. This, in turn, causes outward movement of the legs, or mounting arms 68, and retention tabs 54. When the pressure is released, the tabs 54 return to their original position. In this manner, the coupler can be mounted to, and released from, the body 40 of the head 16.

The head 16 includes an elongated rail 40 and a compressible pad 18, for example a foam block. The rail 40 may comprise, for example, an extruded member formed of plastic, aluminum, or alloy, and having a "U"-shaped profile as shown. The pad 18 is mounted in cavity 19 of the body 40, and may be press-fit, or otherwise bonded in place. The pad 18, is, for example, rectangular in shape and may be formed of low-density foam or rubber, having a certain degree of compressibility so as to conform to an abutting surface, while still exhibiting resiliency and shape memory. The body 40 further includes a horizontal groove 56 on each outer side surface for interfacing with the retention tabs 54 on the arms 68 of the coupler 20, and central slot 58, for interfacing with the pin 66 on the body of the coupler 20.

FIG. 3 is a close-up perspective view of a head coupler 20 in accordance with the present invention. In this view, it can be seen that the socket 62 includes voids, or slots 63, which allow for elastic expansion of the socket 62 about an inserted ball. In addition, the lower portion of the body 50 includes elasticity grooves 51, for improving the elasticity of the body 50 to allow for ease in deformation when mounting the body to a head. The geometry of the neck retainers 52 is also visible in this view. The neck retainers 52 are preferably spaced apart a suitable distance so as to retain the neck to prevent lateral rotation of the neck about the head and to permit free longitudinal rotation of the neck about the head. Other geometries of the head coupler and its various components and features are equally applicable to the present invention.

FIGs. 4A and 4B are side views of the coupler 20 being coupled to a head 16, in accordance with the present invention. In FIG. 4A, a neck 21 and ball 60 of the jack assembly are pushed into the socket 62 of the coupler. With reference to FIG. 4B, once inserted, the ball 60 is press-fit into the socket 62, while neck retainers 52, extending from the body 50 prevent motion in the lateral direction, as indicated by arrows 76. In addition, with reference to the top view of the ball 60 and neck 21 assembly of FIG. 4C, the neck can be provided with a flange 63 having flat edge features 63 as shown. The flat edges 63 of the flange 60 are configured such that, when the ball is mounted into the socket, as shown in FIG. 4B, the flat edges 63 interface with the inner surfaces of the neck retainers 52, thereby preventing horizontal pivot of the head 16 assembly about the neck 21, as indicated by arrow 77. In this manner, greater control over the positioning of the head can be realized during mounting.

Returning to FIG. 4A, when inward pressure, as shown by arrows 78 is applied to the handles 64 of the coupler 20, the body 50 of the coupler flexes and the arms 68 move in an outward direction, as indicated by arrows 80. Outward movement of the arms 68 in turn causes the retention tabs 54 to deflect outwardly as shown, such that the tabs 54 can be positioned in the opposed horizontal grooves 56 of the rail 40. Coupler pin 66 is aligned with the central slot 58



of the rail 40 to serve as a mounting guide. In addition, the coupler pin provides a point for leverage when mounting and removing the coupler 20, ensuring that when force is applied to the handles, both sets of tabs are released at the same time from the rail.

As shown in FIG. 4B, when the inward pressure 78 is released, the retention tabs 54 are fixed in the horizontal slots 56, and bear on an upper portion thereof. At the same time, the lower surface of the body of the coupler 20 bears down on an upper surface 70 of the body of the rail 40. Non-skid material, for example, in the form of rubber plugs 71 inserted into the lower surface of the coupler 20 body, further provide for a secure fit between the coupler 20 and rail 40, for example preventing slip of the coupler 20 in a longitudinal direction of the rail 40. The interaction of the retention tabs 54 and the lower surface of the coupler 20, along with the non-skid material 71, secures the coupler 20 to the head 16.

In one embodiment, the present invention further allows for positioning of the coupler 20 at a plurality of locations along the length of the rail 40 of the head 16. In the example given above, a suitable amount of inward pressure can be exerted on the handles 64 of the coupler 20 to cause the inward force of the retention tabs 54 to be released slightly. With the retention tabs 54 still interfacing with the rail groove 56, and with the pin 66 still interfacing with the central slot 58, when the retention tabs 54 are released slightly, the coupler 20 slides freely along the rail 40 of the head 16. In this manner, the coupler 20 can be positioned at any desired location along the rail 40. This feature further allows for a plurality of pole and jack assemblies to be mounted to a common head 16. In an alternative embodiment, the positioning of the interface of the coupler 20 and head 16 can be at fixed, indexed positions along the rail 40, for example, spaced apart by a fixed distance.

FIG. 5 is a perspective view of an installed curtain, illustrating sag in the curtain between partition mounts. A curtain 32 is secured to first and second mounting jacks 12 and poles 14, for example of the type disclosed in United States Patent No. 5,924,469. The top edge of the curtain

32 is attached to the heads 34 of the jacks 12, and the poles 14 are adjusted in length at adjustment mechanism 15 so as to be rigid between the floor and ceiling, and such that the head 34 and foot 30 are outwardly biased by the spring within the jack 12. Outward tension in the curtain 32 is created by moving the heads 34 apart from each other, and, ideally, the curtain 32 remains tensioned between them.

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However, due to a variety of factors, including slippage between the jack heads 34 and ceiling, slippage between the curtain 32 and jack heads 34, stretch in the curtain 32 material, or movement of the foot 30 and curtain relative to the floor, or a combination of all of these factors, tension along the upper edge of the curtain, where the curtain interfaces with the ceiling, may be immediately, or eventually diminished, in which case a curtain sag may result, leaving a gap as indicated by arrow 36. Such a gap may be undesirable in many applications.

10

Turning to FIG. 6, an extended-head mount, in accordance with the present invention, can be used to mitigate or eliminate the effects of curtain sag. The head 16 is mounted to pole 14A at spring-loaded jack 12A. The spring, or other compression mechanism, serves to outwardly bias the pole and head with respect to each other, such that upon adjustment of the length of the pole 14A at adjustment mechanism 15A, the foot 30A can be made to interface with the lower portion of the curtain 32 at the floor, and the head 16 can be made to interface with the upper portion of the curtain 32 at the ceiling. The upper portion of the foam pad 18 of the head is in contact with the underside of the curtain 32, and serves to urge the curtain 32 against the ceiling. The foam block 18 of the head has a certain degree of give and therefore conforms to the abutting surface.

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FIG. 7 is a perspective view of an installed curtain, including an extended-head mount, mitigating sag or gaps in the curtain along a wall. In this configuration, the pole length is adjusted at adjustment mechanism 15A so as to compress the foot 30A and head 16 between the floor and wall respectively. The body of the head 16, with foam insert 18, serves to urge the curtain against the wall, under the tension of the compression of the spring in the jack 12A.

FIG. 8 is a perspective view of an installed partition mount having an extended head that utilizes a plurality of supporting poles, in accordance with the present invention. In this example, first and second mounting poles 14A, 14B are both coupled to a common mounting head 16. In this example, the first pole 14A includes a jack assembly 12A as described above, and the second pole 14B, for the purpose of example, does not include such a spring-loaded jack. Instead, a ball 60 and flange 61 are mounted directly to an upper portion of the pole 14B, and the compressibility of the pad 18 in the neck provides sufficient give, such that tension can be applied along the pole 14B between the foot 30 and head 16, via coupler 20B upon proper adjustment of the length of the pole. Alternatively, for example, a longitudinal compression mechanism, for example a spring, may be integrated into the adjustable-length pole 14B. This embodiment is especially useful for applications requiring a central opening, such as a doorway, or in applications where an especially long mounting head is desired, and the amount of support available from a single pole and jack is insufficient.

While this invention has been particularly shown and described with references to preferred embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made herein without departing from the spirit and scope of the invention as defined by the appended claims.

For example, with reference to FIGs. 9A and 9B, side views of alternative embodiments of the coupler and head interface are illustrated. In the example of FIG. 9A, the head includes a U-shaped rail 91 having a flat upper portion 92. The arms 68 of the coupler 20 in this example extend to the lower edge 95 of the rail 91, where retention tabs 54 grasp and retain the edge 95. Non-skid pads 71 may be provided at the interface of the head 16 and coupler 20, as described above. In the example of FIG. 9B, the head includes a flat rail 93, and a flat pad 18 is attached to the bottom surface of the flat rail 93. The arms 68 of the coupler 20 in this example include retention tabs that reach about the body of, and secure, the rail 93. Non-skid pads 71 may be provided, as described above.

In another example, FIGs. 10A, 10B, 10C, and 10D are side views of alternative embodiments of the curtain interface, in accordance with the present invention. In the example of FIG. 10A, the head rail 97A is U-shaped, and a tubular head pad 99A formed, for example, of extruded vinyl, is press fit and optionally bonded into the rail cavity. The hollow shape of the head pad 99A provides compressibility when mounted. In the example of FIG. 10B, the head rail 97B is U-shaped, and a head pad 99B, for example formed of hard rubber, is press fit and optionally bonded into the rail cavity. In this example, the head pad 99B includes a plurality of fingers 101 that extend from the body of the pad as shown. Compressibility in the pad 99B is achieved through the flexibility in the fingers 101. In the example of FIG. 10C, the head rail 97C is flat, with a T-shaped retainer 103 extending from the base. A compressible foam, rubber, or vinyl pad 99C is formed on, or applied to, the rail 97C, held in place by the retainer 103. In the example of FIG. 10D, the head rail 97D, is flat with a U-shaped retainer 105 extending from the base. A compressible foam, rubber, or vinyl pad 99D is inserted in the retainer 105. In this example, the head pad 99D includes a plurality of fingers 107 that extend from the body of the pad as shown. Compressibility in the pad 99D is achieved through the flexibility in the fingers 107.

In other alternative embodiments, the interface of the pole and head may comprise a fixed, non-rotating joint. Alternatively, as shown in FIG. 11, the head coupler 20, for coupling the head 16 and pole 14, may be at a fixed position on the head. In an embodiment that permits rotation of the head relative to the pole, a one-degree-of-rotation joint, for example a hinge 118 or axle, may be used to couple the pole 14 and head 16. In addition, the interface between the pole 14 and the coupler may comprise any of a number of suitable configurations, including, for example, a male/female threaded interface, or a slip-fit interface whereby the pole and coupler mate with each other, with a push-button 114 and corresponding hole 116 for securing the coupler 20 and/or head 16 to the pole 14. A spring 112 may be integrated directly into the pole 14, as shown. The pole 14 may include an adjustment mechanism 15 for adjusting the length, as described above.